

CLAIMS

What is claimed is:

1. A bone-cutting apparatus comprising:
a guide removably attachable to a bone, the guide defining a box-cut opening;
a rotatable mill coupled to the guide, wherein the mill is pivotable within the opening along a cutting plane between a first position, in which the mill is laterally adjustable relative to the opening, and a second position, in which the mill is laterally constrained relative to the opening.
2. The apparatus of claim 1, in which the second position includes a sequence of positions from the first position toward a last position, wherein the last position is determined by a wall of the guide.
3. The apparatus of claim 2, further comprising a rod rotatably supported by the guide and connected with the mill.
4. The apparatus of claim 3, wherein the rod is laterally slidable relative to the opening when the mill is in the first position.
5. The apparatus of claim 3, wherein the rod includes a center hole and two sides holes for selectively receiving the mill.

6. The apparatus of claim 5, wherein the mill is coupled to one of the holes by a press-fit guide pin.

7. The apparatus of claim 3, further comprising a pin supported on the guide engaging a groove in the rod to prevent lateral sliding of the rod relative to the base.

8. The apparatus of claim 4, wherein the rod is prevented from sliding when the mill is in the second position.

9. The apparatus of claim 8, further comprising a pin supported on the guide, and wherein the rod includes a plurality of truncated grooves, such that the pin is selectively engaged in one of the grooves when the mill is pivoted from the first to the second position.

10. A bone-cutting apparatus comprising:
a guide having a base, a bone-attachment flange and two guiding sides, the guide defining a box-cut opening;
a rod rotatably supported by the base, wherein a first portion of the rod includes a plurality of truncated grooves;
a pin attached to the base and selectively engaging one of the grooves; and

a rotatable mill coupled to the rod and movable between a first position, in which the mill is substantially parallel to the base, and a last position, in which the mill is at an angle relative to the base, wherein the mill is laterally adjustable within the opening in the first position, and wherein, when the mill is between the first and the last positions, the pin engages one of the grooves and the mill is laterally constrained.

11. The apparatus of claim 10, wherein the rod is rotatably received in a split bore within the base.

12. The apparatus of claim 11, wherein the pin traverses a first portion of the bore.

13. The apparatus of claim 12, wherein the rod has a chamfered portion preventing engagement of the pin with the grooves when the mill is in the first position.

14. The apparatus of claim 11, further comprising an indexing mechanism for selecting a lateral location of the mill in the first position.

15. The apparatus of claim 14, wherein the indexing mechanism includes a spring-loaded ball plunger and a plurality of detents on a second portion of the rod.

16. The apparatus of claim 10, wherein the mill includes a shaft having a driven end, a cutting portion, and a bore rotatably receiving a pivot pin having an end threadably engaging the rod.

17. A method for performing a box resection of a bone, the method comprising:

attaching a guide to the bone;

pivoting a rotatable mill that is coupled to the guide; and

forming the box resection with the mill.

18. The method of claim 17, further comprising inserting an intercondylar box of a femoral component into the box resection formed in the bone.

19. The method of claim 18, further comprising:
selectively shifting the mill to a lateral location in a box-cut opening of the guide;

pivoting the mill; and

repeating shifting and pivoting until the box resection is completed.

20. The method of claim 16, wherein shifting the mill includes moving the mill to a different engagement position with a rod that is rotatably supported on the guide.

21. The method of claim 19, further comprising:
constraining the mill laterally relative to the box-cut opening prior to pivoting; and
unconstraining the mill after pivoting.

22. The method of claim 21, wherein shifting the mill includes shifting a rod rotatably supported on the guide and coupled with the mill.

23. The method of claim 22, wherein constraining the mill includes pivoting the mill toward the bone to engage a pin attached to the guide into a groove of the rod.

24. The method of claim 23, wherein unconstraining the mill includes pivoting the mill away from the bone until the pin is disengaged from the groove.

25. The method of claim 19, wherein selectively shifting includes shifting with an indexing mechanism.

26. A bone-cutting apparatus comprising:
a guide removably attachable to a bone, the guide defining an opening; and
a rotatable mill coupled to the guide, wherein the mill is pivotable within the opening.

27. The bone-cutting apparatus of claim 26, wherein the opening is box-shaped and the mill pivots within the opening along a plurality of parallel planes that are perpendicular to a lateral axis along which the mill can be shifted.

28. The apparatus of claim 27, wherein the mill cannot be shifted along the lateral axis while pivoting along one of the parallel planes.

29. A bone-cutting apparatus comprising:
a guide removably attachable to a bone, the guide having a base, a bone-attachment flange substantially parallel to the base, and two guiding sides, wherein the guiding sides are perpendicular to the base, and the guide includes a box-cut opening; and
a rotatable mill coupled to the guide, wherein the mill is pivotable within the opening.

30. The apparatus of claim 29, wherein the mill pivots within the opening along a plurality of cutting planes that are perpendicular to a lateral axis.

31. The apparatus of claim 30, wherein the mill is pivotable from a first position substantially parallel to the base to a last position substantially perpendicular to the base.

32. The apparatus of claim 31, wherein in the first position the mill can be moved along the lateral axis.

33. The apparatus of claim 32, wherein the mill cannot be moved along the lateral axis while pivoting from the first to the last position.

34. A knee system comprising:
a femoral component having an intercondylar box; and
a cutter for removing an intercondylar bone portion from a distal end of a femoral bone for receiving the intercondylar box of the femoral component, the cutter including a guide removably attachable to the femoral bone, the guide defining an opening, and a rotatable mill coupled to the guide, wherein the mill is pivotable within the opening to cut the intercondylar bone portion.

35. The knee system of claim 34, wherein the distal end includes medial and lateral condyles, an anterior surface and a posterior surface, and wherein the guide further comprises:
a base;
a flange; and
two guiding sides, wherein the distal end is received between the flange and the base such that the intercondylar bone portion is framed by the guiding sides and is accessible through the opening; and the mill pivots from the

posterior to the anterior surface of the femur within the opening along a cutting plane.

36. The apparatus of claim 35, wherein the mill is slidable between the lateral and medial condyles to another cutting plane when the mill is adjacent to the posterior surface.

37. The apparatus of claim 35, wherein the mill is movable between the lateral and medial condyles to another cutting plane.

38. The apparatus of claim 35, wherein the guide comprises a lateral surface shaped similarly to a lateral surface of the femoral component.